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1981 — Section 3

business flying

NATIONAL
BUSINESS AIRCRAFT
ASSOCIATION, INC.

BUSINESS AIRCRAFT

their place in the aviation industry 1979

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Summary

- An estimated 43.3 million hours of flying time were logged by the 210,339 active general aviation aircraft in the U.S. fleet during 1979. These aircraft had a mean annual flight time per aircraft of 203.5 hours and represented about 85 percent of the registered general aviation fleet. Flying hours increased by 9.9 percent. Active aircraft increased by 5.8 percent. Mean hours flown per aircraft increased 2.9 percent.
- Turboprop aircraft flew over 510 hours per aircraft during 1979, more than any other aircraft type. Twin engine turboprops with thirteen or more seats flew more than 1,000 hours per aircraft. In contrast, single engine piston powered aircraft averaged about 180 hours per aircraft during the year.
- The most common primary use of a General Aviation aircraft was Personal for an estimated 45 percent of the active fleet, followed by business for 24 percent of the fleet, and instructional for 7 percent of the fleet.
- Over 83 percent of the general aviation aircraft had two-way VHF communication equipment, almost 59 percent were equipped with 4096-code transponders, almost 55 percent had at least one component of an instrument landing system, and almost 80 percent had some form of navigation equipment.
- An estimated 41 percent of the active general aviation fleet flew by instrument flight rules (IFR) at some time during 1979. This represents a 4 percent increase over 197.
- The general aviation aircraft fleet consumed an estimated 1,306 million gallons of fuel during 1979, 570 million gallons of aviation gasoline and 736 million gallons of jet fuel.

Five years before, in 1974, there were 168,817 General Aviation aircraft of which 44,803 or 26.5 percent were categorized as corporate/business. In 1979, the corporate/business fleet represented 30.1 percent of General Aviation aircraft. The number of corporate/business aircraft increased by 18,493 units in the five-year period. Total General Aviation Flying Hours of 43,340,000 represents a steep increase of 38 percent over the 31,413,000 flown five years ago in 1974.

Introduction

The Federal Aviation Administration annually publishes a series of statistics that demonstrate how General Aviation fits into the overall aviation picture and what part business and corporate aviation plays in this picture. The latest published figures are those for 1979.

There is no question that General Aviation is the dominant force in the sky with 99 percent of the civil air fleet, 84 percent of civil operations at FAA towered airports and close to 85 percent of the total hours flown by the U.S. civil air fleet.

General Aviation, by FAA definition, includes all aircraft operated under

Part 91: General operating and flight rules
Part 123: Air travel clubs, using large aircraft
Part 133: Rotorcraft external load operations
Part 135: Air taxi operators and commercial operators of small aircraft
Part 137: Agricultural aircraft operations

The FAA has divided the aircraft that operate under these flight rules into nine "primary use" categories. By definition they are as follows:

Corporate: Any use of an aircraft by a corporation, company, or other organization for the purpose of transporting its employees and/or property, but not for compensation or hire, and employing professional flight personnel for the operation of the aircraft.

Business: Any use of an aircraft, not for compensation or hire, by an individual for the purpose of transportation required by a business in which he is engaged.

Personal: Any use of an aircraft for personal purposes not associated with a business or profession, and not for hire.

Aerial Application: Consists of those activities that involve the discharge of materials from aircraft in flight.

Instructional: Any use of an aircraft for the purpose of formal instruction with the flight instructor aboard.

Air Taxi: Any use of an aircraft by the holder of an Air Taxi Operating Certificate.

Industrial: Use of an aircraft for specialized work allied with industrial activity — pipeline patrol, survey, advertising, photography, helicopter hoist.

Rental: Aircraft used primarily for short periods by airmen on which a fee is paid.

Other: Research and development, marketing and sales demonstration, sport parachuting, etc.

NBAA voting members are in the corporate and business category.

This issue summarizes General Aviation activity for 1979, postures business and corporate aviation in the general aviation picture, notes past and continuing trends in equipment and avionics and includes information about fuel consumption.

1979 Active Aircraft Hours Flown

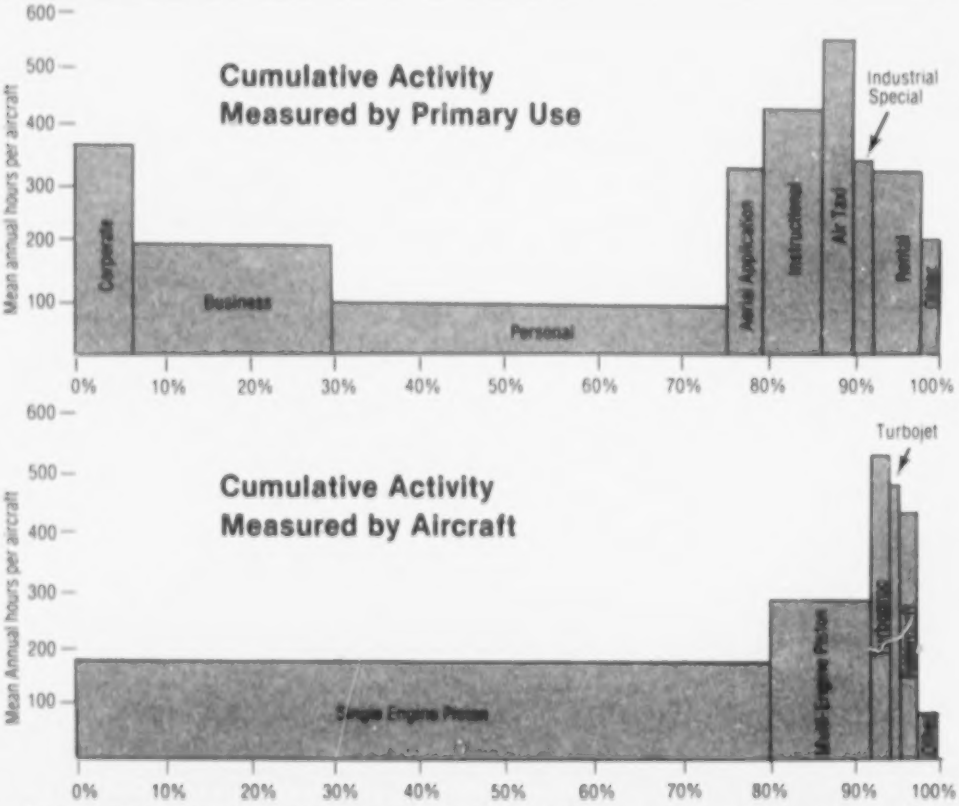
Hours in thousands

Aircraft Type	Total Active	Corporate	Business	Total Corporate Business	Personal	Aerial Application	Instructional	Air Taxi	Industrial	Rental	Other	1974
Fixed-Wing Piston	193,470	8,670	48,071	56,741	90,395	6,630	14,808	6,299	2,577	12,222	3,795	153,564
Hours	37,302	2,715	8,485	11,200	9,209	2,037	6,314	2,952	807	4,109	651	
Turboprop	3,579	2,357	442	2,799	62	34	3	490	14	25	148	1,603
Hours	1,871	1,065	169	1,234	36	20	5	496	7	6	46	
Turbojet	2,653	1,980	94	2,074	5	0	45	245	1	46	233	1,287
Hours	1,258	937	61	998	—	—	30	137	—	24	67	
Rotorcraft	5,864	597	651	12,485	689	808	288	1,358	663	30	776	3,171
Hours	2,555	301	234	535	41	313	58	1,032	309	7	260	
Total Aircraft	210,339	13,638	49,658	63,296	94,427	7,494	15,456	8,399	3,259	12,771	5,236	168,817
Hours	43,340	5,000	8,979	13,979	94,709	2,372	6,461	7,572	1,119	4,206	1,051	

Five years before, in 1974, there were 168,817 General Aviation aircraft of which 44,803 or 26.5 percent were categorized as corporate/business. In 1979, the corporate/business fleet represented 30.1 percent of General Aviation aircraft. The number of corporate/business aircraft increased by 18,493 units in the five-year period. Total General Aviation flying hours of 43,340,000 represents a steep increase of 38 percent over the 31,413,000 flown five years ago in 1974.

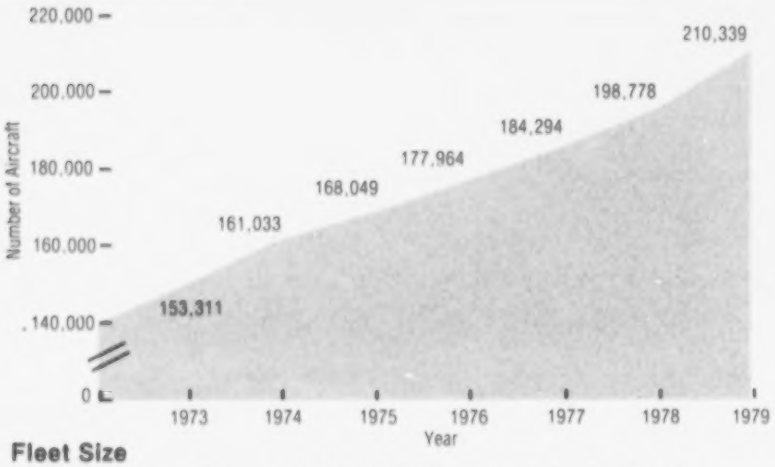
The fastest growth of any aircraft type in terms of total hours flown occurred to turbine-powered rotorcraft with an average annual growth rate of 21.59 percent. They were followed by twin engine turboprops with 1-12 seats at 13.98 percent. In general, it was the activity of the more sophisticated aircraft, the aircraft usually flown by business in the General Aviation fleet that grew faster than the other components of the fleet.

In terms of sheer numbers, single engine piston aircraft dominated the active fleet and contributed the largest portion of total flying time, yet had one of the lowest mean flight times per aircraft. In contrast, the turboprops, turbojet aircraft, and rotorcraft had low representation in the active fleet but contributed a relatively high proportion of flight time resulting in the greatest mean flight hours of any of the major aircraft types.



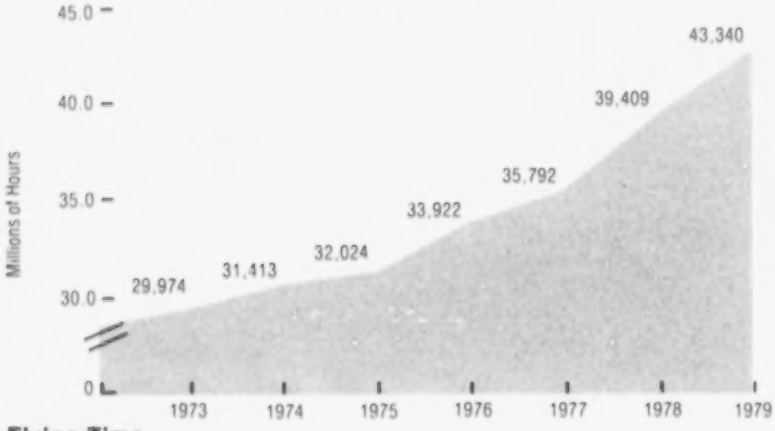
The area within each box is proportional to the total flying time for each primary use. Aircraft used as air taxis and for instructional and executive purposes showed high individual usage with mean hours per aircraft of 544.4, 418.1, and 366.7, respectively. General Aviation aircraft were used most commonly for personal and business purposes, representing 45 and 24 percent of the active fleet. Due either to their high representation in the fleet or to their high individual usage, personal, business, corporate, air taxi and instructional use aircraft together accounted for 80 percent of the total hours flown by the general aviation fleet.

Trends in General Aviation 1973-1979



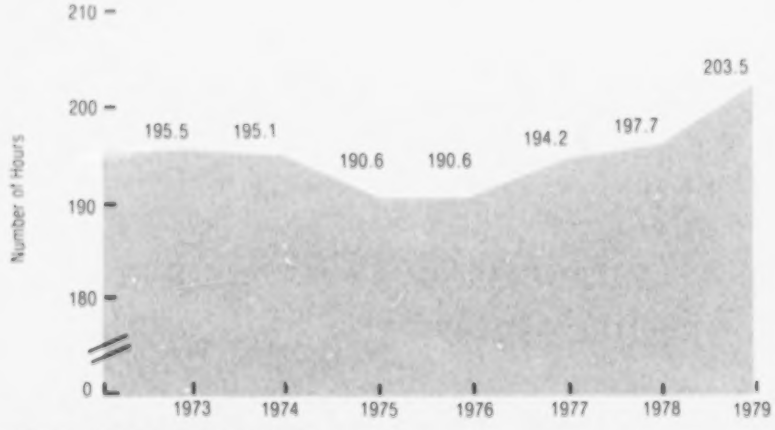
Fleet Size

The trend in general aviation is upward. There are more general aviation aircraft in use and they fly more hours. The six year compounded annual growth rate from 1973 in actual aircraft was 5.41 percent.



Flying Time

The growth rate in hours flown compounded annually for the period was 6.34 percent.

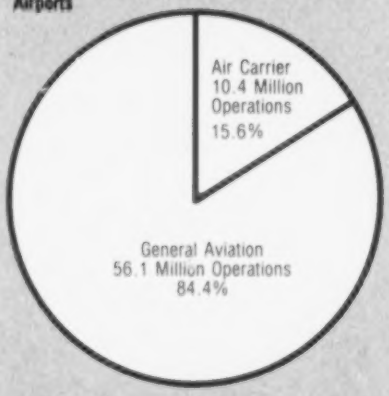


Mean Annual Flying Time

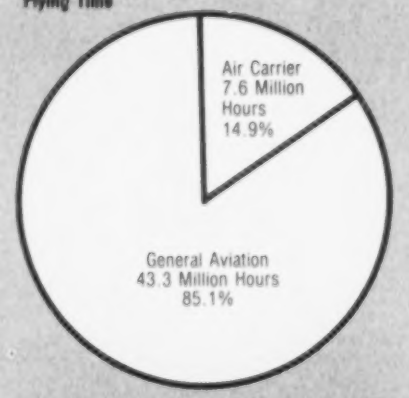
There was a 2.9 percent increase in mean hours per aircraft over the comparable figures for 1978. Mean hours are sensitive to small differences between the growth rates of total hours and fleet size. Consequently, mean hours dip from about 195 hours per aircraft in 1973 and 1974 to about 191 hours per aircraft in 1975 and 1976, then climb steadily to their 1979 level of 203.5 hours per aircraft.

Comparison of General Aviation and Air Carrier Activity in 1979

Civil Operations at FAA Towered Airports



Flying Time



The bulk of air activity is attributed to General Aviation compared to air carriers. Many more General Aviation aircraft fly people and materials to many more destinations in the nation's air transportation system than air carriers. The nation's airlines use approximately 300 airports while business aviation uses approximately 4,000 airports.

Profile of Selected Aircraft Characteristics

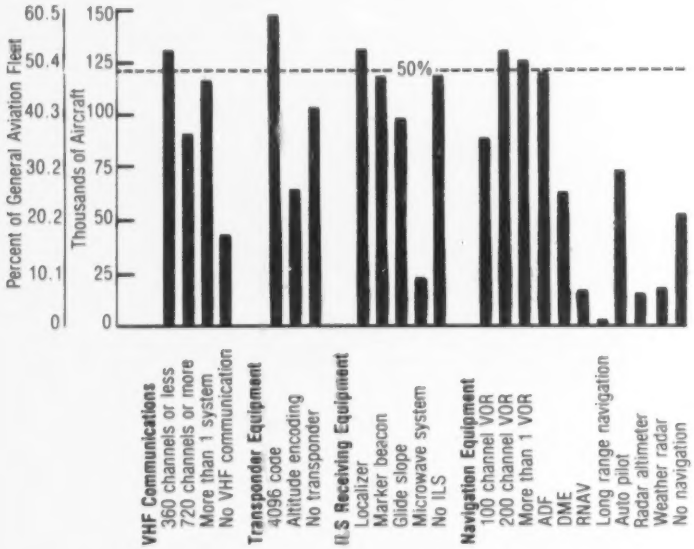
This is a summary of selected statistics for General Aviation aircraft for the year 1979 from the FAA's Office of Aviation Policy and Plans. The statistics cover the subjects of mean flying time, avionics equipment fuel use and fuel taxes by aircraft type for the year 1979.

Type of Aircraft	Single Engine Piston 1-3 Seats	Single Engine Piston 4 or more seats	Twin Engine Piston	Multi-Engine	Turboprop	Turbojet	Rotorcraft (1-15 seats)
Mean Number of Flying Hours/Year	180.2	180.2	273.2	650.4	511.7	473.2	433.5
Mean Number IFR Hours/year	36.0	52.1	131.0	363.8	395.6	440.0	180.7
ILS	17.9	73.9	95.7	74.1	98.0	96.0	12.8
VOR	57.1	100.0	100.0	100.0	98.9	96.7	28.9
DME	1.2	30.3	83.1	45.7	94.9	94.3	7.7
Estimated Annual Fuel Use (Gallons)	1,495	1,968	8,566	149,782	54,046	180,520	6,519
Estimated Annual Fuel Tax @7¢ gallon	$ 105	138	600	10,485	3,783	12,636	456

Avionics Use Increases

	VHF Communications			Transponder Equipment			ILS Receiving Equipment				
	360 CH	720 CH	2+ Sys	No Comm	4096 Code	Alt Enc	No Trans	LOC	Mkr Bec	Glide Slope	MLS	No ILS
Corporate												
Estimated Population	3,838	9,978	10,883	666	12,758	10,755	1,262	12,276	11,985	11,815	234	1,704
Estimated % of Use	28.1	73.2	79.8	4.9	93.6	78.9	9.3	90.0	87.9	86.6	1.7	12.5
Business												
Estimated Population	25,799	25,612	36,454	1,548	44,050	24,210	6,479	40,191	37,926	33,398	203	9,151
Estimated % of Use	52.0	51.6	73.4	3.1	88.7	48.8	13.0	80.9	76.4	67.3	0.4	18.4

	Navigation Equipment										
	VOR 100 CH	VOR 200 CH	2+ RCVR	ADF	DME	RNAV	LRNAV	Autopilt	Radar Alt	Wthr Radar	No NAVEQ
Corporate											
Estimated Population	3,083	10,349	11,448	12,361	11,322	5,601	1,304	11,399	8,327	7,949	780
Estimated % of Use	22.6	75.9	83.9	90.6	83.0	41.1	9.6	83.2	46.4	58.3	5.7
Business											
Estimated Population	18,728	31,384	39,961	39,180	26,366	7,079	472	28,629	4,035	4,492	1,962
Estimated % of Use	37.7	63.2	80.5	78.9	53.1	14.3	1.0	57.7	8.1	9.0	4.0

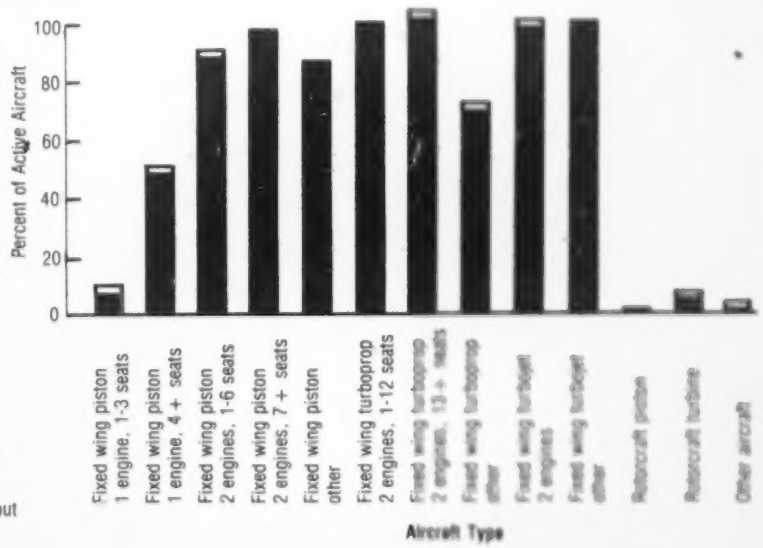


Avionics Equipment Installed

Over 83 percent of general aviation aircraft have two-way VHF communications, almost 59 percent are equipped with 4096-code transponders, almost 55 percent have at least one component of an instrument landing system, and almost 80 percent have some form of navigation equipment. Comparing the 1979 and 1978 avionics estimates the General Aviation fleet is becoming more sophisticated in terms of its avionics equipment. Within two-way communications there was a significant shift from 360 channel to 720 channel equipment. Likewise within VOR receivers there was a shift from 100 channel to 200 channel equipment. The proportion of the general aviation fleet with transponders increased from 53.3 percent to 58.9 percent, and the proportion with at least one part of an ILS increased from 51.0 percent to 54.2 percent. The proportion of aircraft having two or more communications systems and the proportion with two or more VOR receivers increased by four percent from 1978 to 1979.

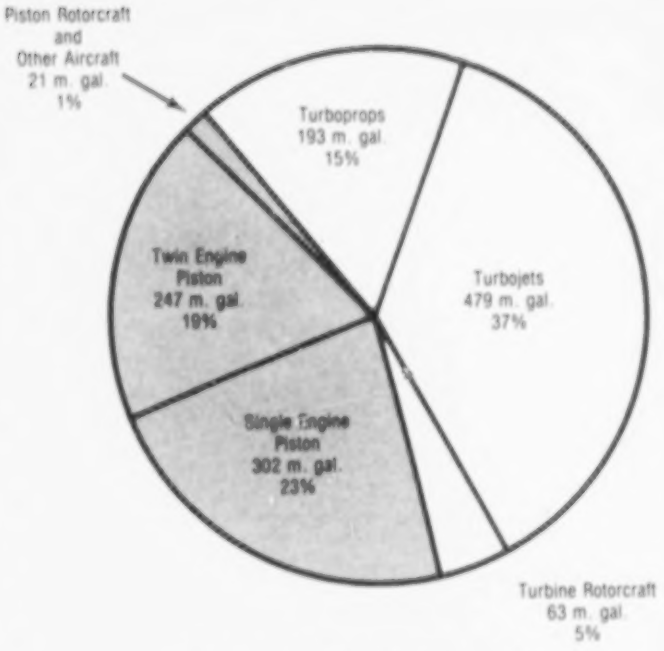
IFR Flown and Transponder Equipped

The graph at right shows the portion of active aircraft of each type which engaged in IFR (Instrument Flight Rules) flight during 1979 and the portions that flew IFR with and without transponder equipment. Almost all active twin engine piston aircraft, turboprops, and turbojets, the three most commonly flown business aircraft, flew IFR at some time during 1979 and were equipped with transponders. A much lower proportion of the active single engine piston aircraft and rotorcraft in the fleet flew IFR during the year, and not all were equipped with transponders.



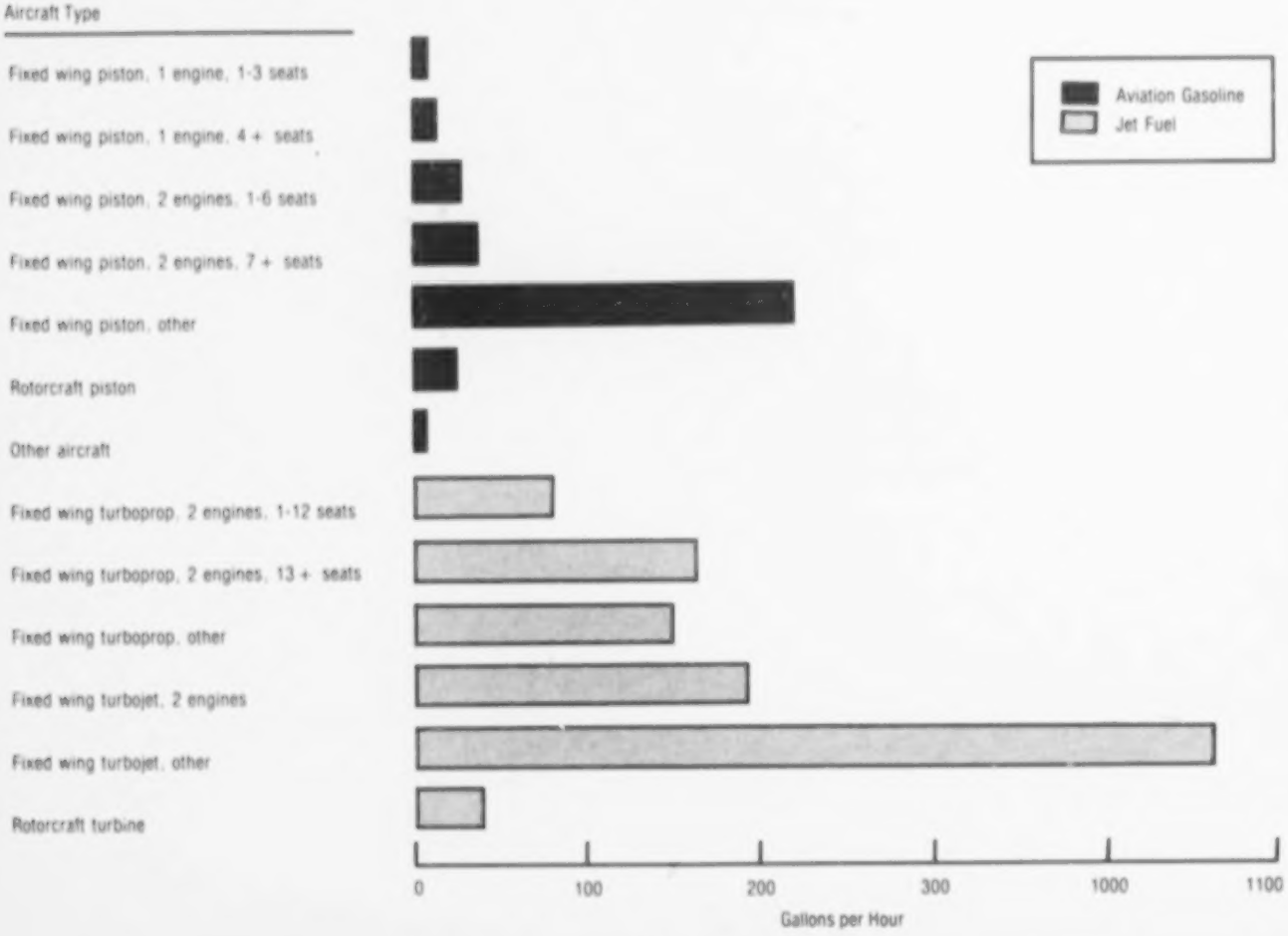
Fuel Consumed

The General Aviation aircraft fleet consumed an estimated 1.3 billion gallons of fuel during 1979. 570 million gallons of aviation gasoline and 736 million gallons of jet fuel. Turbojet and turboprop engines consume fuel at much higher rates than piston engines. In fact, turbojets with more than 2 engines consume over 1000 gallons of jet fuel an hour on the average. The high rates account for turbojets' burning 37 percent of all fuel consumed in 1979. Single and twin engine piston aircraft together account for 39 percent of the fuel consumed in 1979 due to their high representation in the General Aviation fleet.


Piston Rotorcraft and Other Aircraft 21 m. gal. 1%
Turboprops 193 m. gal. 15%
Turbojets 479 m. gal. 37%
Twin Engine Piston 247 m. gal. 19%
Single Engine Piston 302 m. gal. 23%
Turbine Rotorcraft 63 m. gal. 5%
Aviation Gasoline
Jet Fuel

Estimated Fuel Consumption

Mean Fuel Consumption Rates



General Aviation Forecast

(thousands)

As of January 1	Total	Fixed Wing				Rotorcraft		Balloons Dirigibles Gliders
		Piston						
		Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine	
Historical								
1980E	208.0	167.1	24.5	3.4	3.0	2.9	2.9	4.2
Forecast								
1981	218.7	175.8	25.0	3.8	3.2	3.1	3.2	4.6
1982	228.5	183.2	26.0	4.2	3.4	3.3	3.4	5.0
1983	237.1	189.4	26.9	4.6	3.7	3.4	3.7	5.4
1984	245.8	195.7	27.9	5.0	4.0	3.5	4.0	5.7
1985	254.5	20.1	28.8	5.3	4.3	3.6	4.3	6.1
1986	263.2	208.5	29.7	5.6	4.6	3.8	4.6	6.4
1987	271.4	214.4	30.7	5.9	4.8	3.9	4.9	6.8
1988	280.7	221.2	31.6	6.2	5.1	4.1	5.3	7.2
1989	289.4	227.6	32.6	6.5	5.4	4.2	5.6	7.5
1990	298.1	234.0	33.5	6.8	5.7	4.3	5.9	7.9
1991	306.8	240.4	34.4	7.1	6.0	4.5	6.2	8.2
1992	315.5	246.8	35.4	7.4	6.2	4.6	6.5	8.6

On the Horizon

Predictions come from a survey made by the FAA Office of Aviation Policy and Plans. Predictions were made before the Air Traffic Controllers strike of August 3, 1981. Because of the strike, short run predictions may be off but long range trends will continue. General Aviation growth is expected to be concentrated in the higher performance, better equipped, multi-engine aircraft which make up the business fleet. These aircraft are entering the GA fleet at a rate double that of single-engine aircraft.

By 1993 the FAA expects towered airport traffic to be made up of 79 percent General Aviation aircraft, up from 74 percent in 1980. En route traffic for General Aviation aircraft is expected to rise from 30 to 43 percent of the total.

Fuel costs for General Aviation aircraft are expected to rise at an annual rate of 7.7 percent.

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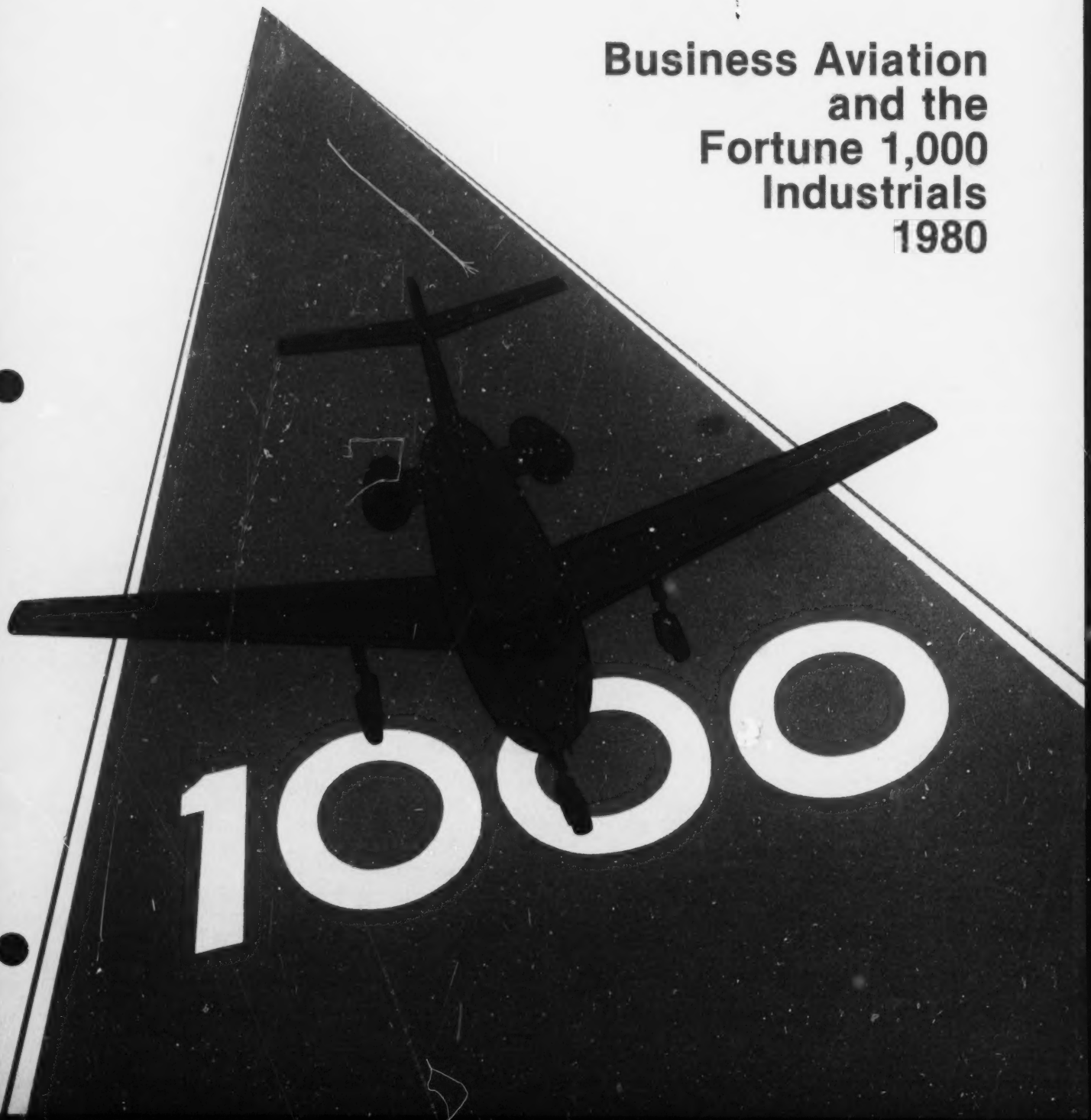
business flying

1982 — Section 1

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

Business Aviation and the Fortune 1,000 Industrials 1980



Introduction

The 1,000 largest industrials are identified by ***Fortune*** magazine, and the economic performance is reported in the May and June issues of the magazine each year. Information on companies operating business aircraft and the specifications associated with these companies are an outgrowth of a study done annually by Aviation Data Service (ADS), Wichita, Kansas.

Summary

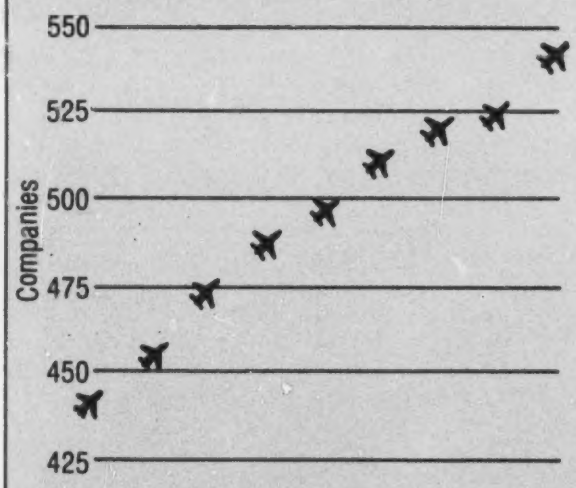
The majority of the leading industrial companies of the United States operate business aircraft. Of the 1,000 largest publicly held corporations in the United States, 541 operate one or more business airplanes. Value of the fleet now totals $3.21 billion, up from $1.76 billion a year ago.

The company airplane is measured by the same performance standards as any piece of capital equipment owned and/or operated by the industrials. During the 1980 year, the number of companies operating business aircraft grew from 524 to 541. At the beginning of 1981, companies operating aircraft had a total of 2,012 aircraft, up from 1,842 a year earlier.

During 1980, 272 aircraft were purchased by the leading industrials, and they had a value of $385 million. In the same time period, these companies sold 190 aircraft valued at $139 million.

On the financial side, the 541 ***Fortune*** 1,000 corporations that operated aircraft during 1980 accounted for 88 percent of the sales, 88 percent of the net income, 88 percent of the assets, 88 percent of the stockholder's equity, and 83 percent of the total employees. They represented an aircraft fleet at year-end of 2,012 units, ranging in size from a J3 Piper Cub up to and including a Boeing 737. Value of the fleet increased 82 percent during the year to $3.21 billion. This is due to several reasons. First, last year's inflation of approximately 15% accounted for part of this. Also, after about five years, a jet will tend to appreciate in price rather than depreciate. This is particularly true with the "heavy iron" equipment. Boeing's ex-airliners, Lockheed JetStars and Gulfstream American models have all reflected substantial price boosts. Gulfstream G2 model increased about 40 percent in the last year. This is due partly to the cancellation of Canadair's long-range model. Since the G3 and Falcon 50 are new models with long order books, there is now a scramble for used, large executive long-range jets. In one instance, one corporation was offering to pay $15 million for a late model tiptanked G2.

Fortune 1,000 List Adds 17 Aircraft Operating Companies



The number of companies in the Fortune 1,000 has shown a steady increase to 541 in 1980. Aircraft owned or operated by these companies grew at a rapid rate in 1980 to 2,012. There were seventeen more companies and 170 more aircraft in the Fortune 1,000 than there were in 1979.

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The majority of super corporations operating aircraft — 68 percent in 1980 — continue to be found among the top 500 industrials. The trend, however, is for a greater increase of aircraft-operators among those below the 500 level. Since Aviation Data Service, Inc. (ADS) began compiling these statistics in 1969, there has been a 3.45 percent annual increase in aircraft operators among the second 500 companies, compared to a 2 percent annual increase among the top 500 in the last ten years.

In comparing 1980 against 1979, there was a 2.2 percent increase in operators among the top 500, but a 5.5 percent increase among those below the 500 level.

Not surprising, however, 86 percent of the *Fortune* 1,000 fleet is operated by the top 500 and 43 percent by the top 100 companies alone, based on net sales. Interestingly, only four companies in the top 100 did not operate aircraft in 1980.

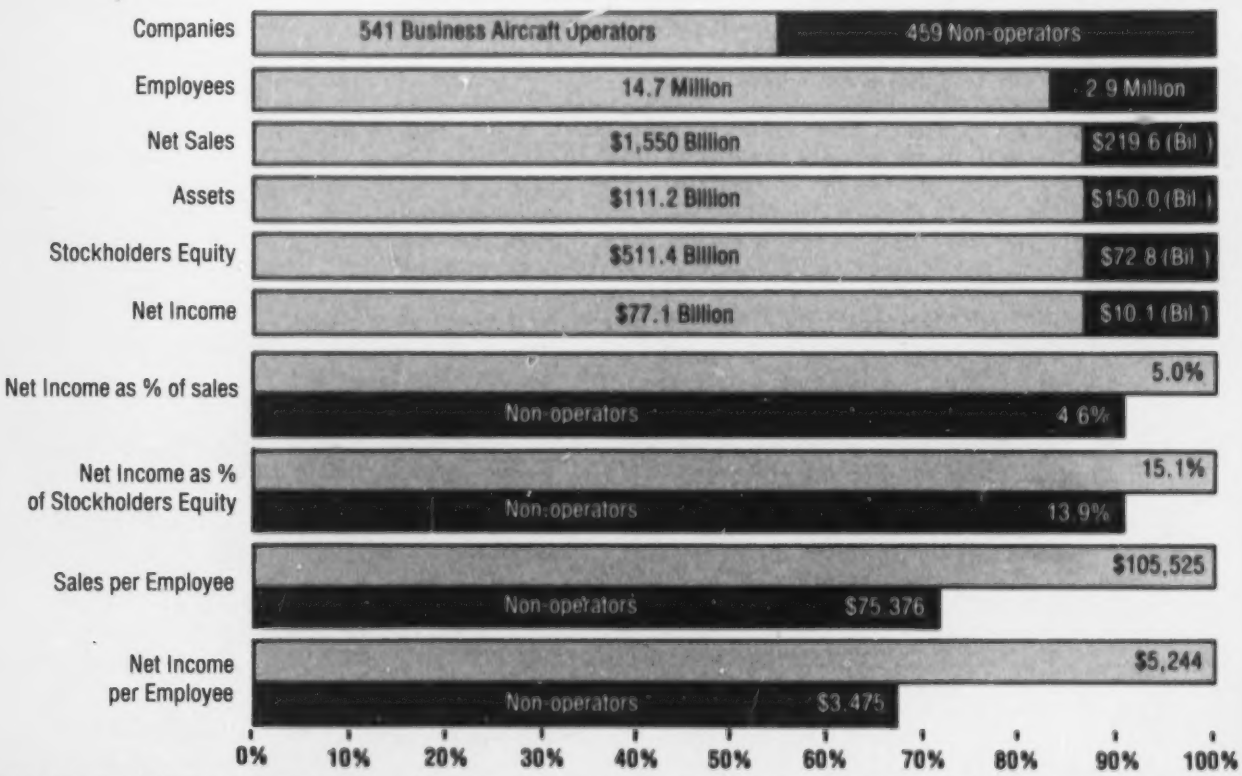
There were 53 newcomers to the *Fortune* listing during 1980 and they brought 87 aircraft into the compilation. In addition, existing *Fortune* 1,000 companies acquired 272 new or used aircraft during the year. On the other hand, 11 companies with 23 aircraft dropped out of the top 1,000. There were 13 companies that sold their aircraft during the year and are no longer operators; 190 aircraft flown by existing operators were either lost from service or sold. Nine companies were absorbed into larger corporations, causing a net loss of nine operating companies.

Value of Corporate Aircraft

Value of corporate aircraft can be a very controversial subject, but among the top 1,000 industrials, the differences in the business results between aircraft operators and non-operators is staggering.

Keeping in mind that there are roughly the same number of operators 541 as there are non-operators 459 — net sales by aircraft-operating companies of $1.551 trillion was over seven times that of non-operating *Fortune* companies.

Fortune 1,000 Summary



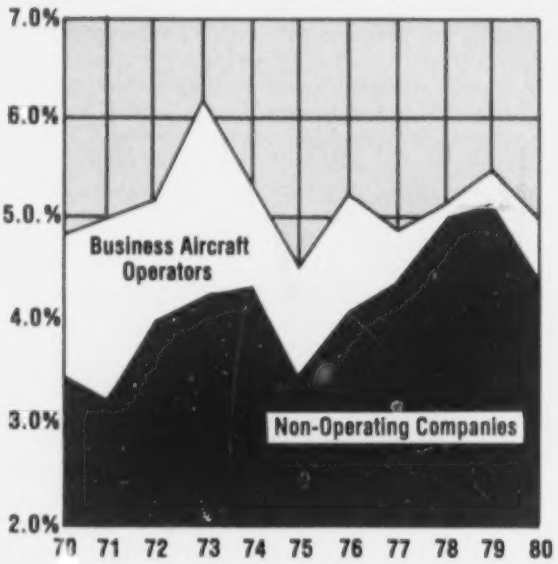
The 1,000 topmost industrial companies ranked by sales are listed each year by Fortune magazine. In 1980 Exxon displaced General Motors as world leader with over $79 billion in sales. General Motors was second with over $66 billion in sales and Mobil was third with over 44 billion. Those companies that operate aircraft outperformed those without aircraft in every category: employees, net sales, assets, stockholders equity and net income. This chart shows the dramatic comparison. Use of aircraft is not the only measure of success in business, but those companies that do operate aircraft do far better than those companies that do not use aircraft by whatever standard of measurement is used.

Corporate assets for those same 541 aircraft operators were $1.112 trillion or almost seven and on-half times those of non-operators; net income of $77.1 billion was over seven and one-half times greater; and the 14.7 million employees of operating companies was over five times greater than the employment of non-operating companies.

Net income as a percentage of sales averaged 5.0 percent for the top 1,000 industrials operating aircraft as opposed to 4.6 percent for non-operating companies.

In terms of sales per employee, the 541 companies that operate aircraft bettered the non-operating companies by 40 percent, and in terms of assets per employee, by 47 percent. Net income per employee for those companies operating aircraft was a substantial 51 percent higher than those companies tied to ground transportation and/or the commercial airlines.

Net Income As a Percent of Sales



The gap between net income as a percent of sales between aircraft operating companies and non-aircraft operating companies had been narrowing prior to 1979. This trend has reversed, and the aircraft operating companies did one-half percent better than non-aircraft operating companies in 1980.

What Kind of Businesses Operate Aircraft?

There is no specific pattern to business aircraft users among the 28 categories of Standard Industrial Classification (SIC). The standouts are food processors, petroleum refiners and manufacturers of industrial and farm equipment. For instance, industrial and farm equipment represents the greatest number of ***Fortune*** 1,000 aircraft operators at 61; 60 percent of all companies in that category. Second among operators are food processors, numbering 53. The top percentage among groups is aerospace, with 82 percent of the companies operating aircraft.

Of all ***Fortune*** 1,000 companies 8.8 percent are in food processing. They represent 9.8 percent of the 541 aircraft operators, but only 6.9 percent of the fleet. Petroleum refiners, on the other hand, represent only 5.2 percent of the 1,000 companies, 7.0 percent of those that operate aircraft, and 17.2 percent of the ***Fortune*** aircraft fleet.

Dropping down to manufacturers of industrial and farm equipment, that category represents the greatest number of operators at 11.3 percent, while accounting for 9.7 percent of the ***Fortune*** fleet. It is not difficult to determine which categories operate the large fleets and which operate more modest fleets.

As a matter of fact, 188 of the 541 operating companies or nearly 35 percent, operate only one aircraft. Eight companies operate 19 or more aircraft with the largest fleet being 38.

Sales

In terms of sales, the leading SIC category among non-operators is food processing with $23.6 billion in 1980. But they were soundly outdistanced by those ***Fortune*** 1,000 food processors that do operate aircraft, logging $115.4 billion. As might be expected, the leader in sales was petroleum refiners with $513.7 billion total, of which aircraft operators captured $498.2 billion, or 97 percent of the total. This same pattern holds true in terms of corporate assets, net income and stockholders' equity.

Employment

Fortune companies operating aircraft completely outpaced non-operating companies in total employment during 1980 — 13.7 million versus 2.9 million, or 83.5 percent of the total 17.6 million workers.

The recession of 1980 hit the ***Fortune*** 1,000 industrials substantially in the area of employment. During the year, employment dropped 3.1 percent in the total industrials. Employment dropped 1.3 percent in the operating block, but dropped an alarming 5.7 percent for the non-operating companies. This could lead one to believe that working for a company which utilizes aircraft is a more stable place of employ.

Productivity Per Employee

Statistics show that the average sales per employee for the aircraft operating companies were $105,525, or 40 percent better than companies without aircraft. Incidentally, employees of companies in the category of mining and crude oil production that operate aircraft outperformed their colleagues in non-operating companies by 145 percent. On the other hand, employees of jewelry and silverware non-operating companies bettered their comrades by 45 percent.

In terms of net income per employee for all the 1,000 industrials, the difference is even more dramatic. Employees of aircraft operators average $5,244 each in *net income* to their companies, 51 percent better than employees of the non-operating companies. In petroleum refining alone, the spread was an astounding 539 percent — $25,780 per employee versus $4,033.

Companies by Classification

Industrial Classification	Aircraft	Percent	Operators	Percent Operating Companies	Non-Operators	Total Companies
Mining, Crude Oil Production	71	3.53	23	4.25	8	31
Food	138	6.86	53	9.80	35	88
Tobacco	19	.94	5	.92	2	7
Textiles, Vinyl Flooring	30	1.49	16	2.96	19	35
Apparel	18	.89	10	1.85	16	26
Furniture	6	.30	5	.92	5	10
Paper, Fiber & Wood Products	118	5.86	31	5.73	21	52
Publishing, Printing	39	1.94	12	2.22	27	39
Chemicals	128	6.36	38	7.02	23	61
Petroleum Refining	346	17.20	38	7.02	14	52
Rubber, Plastic Products	31	1.54	10	1.85	10	20
Leather	4	.20	2	.37	3	5
Glass, Concrete, Abrasives, Gyps	52	2.58	22	4.07	9	31
Metal Manufacturing	111	5.52	35	6.47	27	62
Metal Products	93	4.62	34	6.28	32	66
Electronic Appliances	154	7.65	38	7.02	42	80
Shipbldg RR & Transport Equip	13	.65	8	1.48	12	20
Measuring, Scientific, Photo Eq	38	1.89	15	2.77	25	40
Motor Vehicles	109	5.42	20	3.70	11	31
Aerospace	152	7.55	14	2.59	3	17
Pharmaceuticals	34	1.69	12	2.22	10	22
Soaps, Cosmetics	13	.65	5	.92	12	17
Office Equipment (Computers)	37	1.84	6	1.11	19	25
Industrial & Farm Equipment	195	9.69	61	11.28	40	101
Jewelry, Silverware	4	.20	3	.55	3	6
Musical Instr, Toys, Sport Gds	11	.55	5	.92	12	17
Broadcasting, Motion-Picture	11	.55	8	1.48	5	13
Beverages	37	1.84	12	2.22	14	26
Total	2012	100.00	541	100.00	459	1,000

Companies engaged in food production and industrial and farm equipment had the largest amount of aircraft operators in the 28 categories of Standard Industrial Classification (SIC). There are 114 aircraft operating companies in food processing with a total of 333 aircraft. Leader in total aircraft is the petroleum refining category with 346 aircraft.

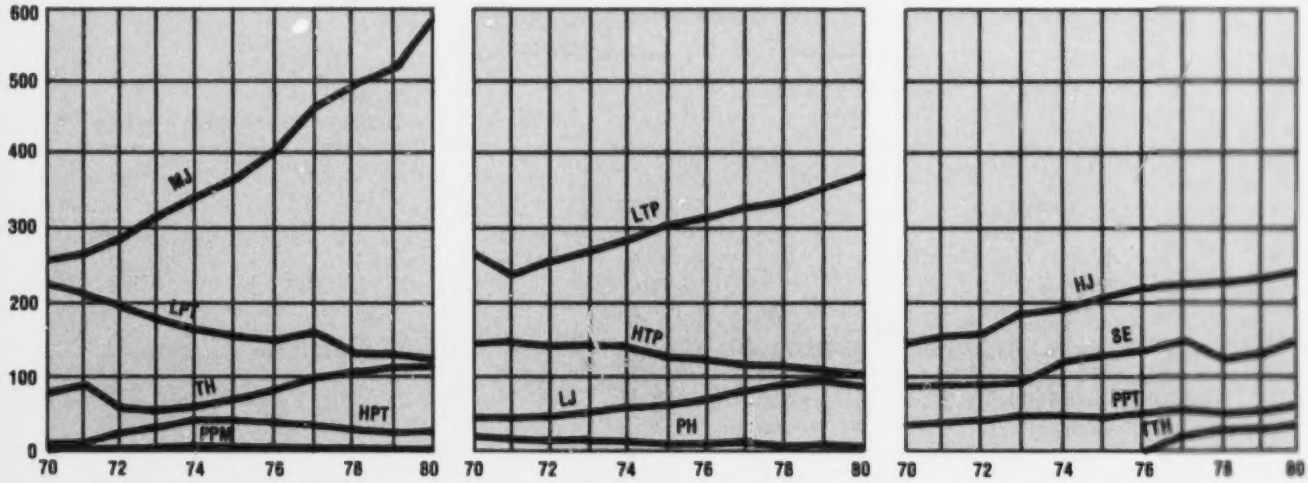
What Are the Most Popular Aircraft?

It's one thing to look at the ***Fortune*** 1,000 fleet in terms of unit growth by type. But it's another thing to look at the fleet in terms of type as a percentage of the total — in other words, the areas of growth and decline.

Medium Jet Most Popular

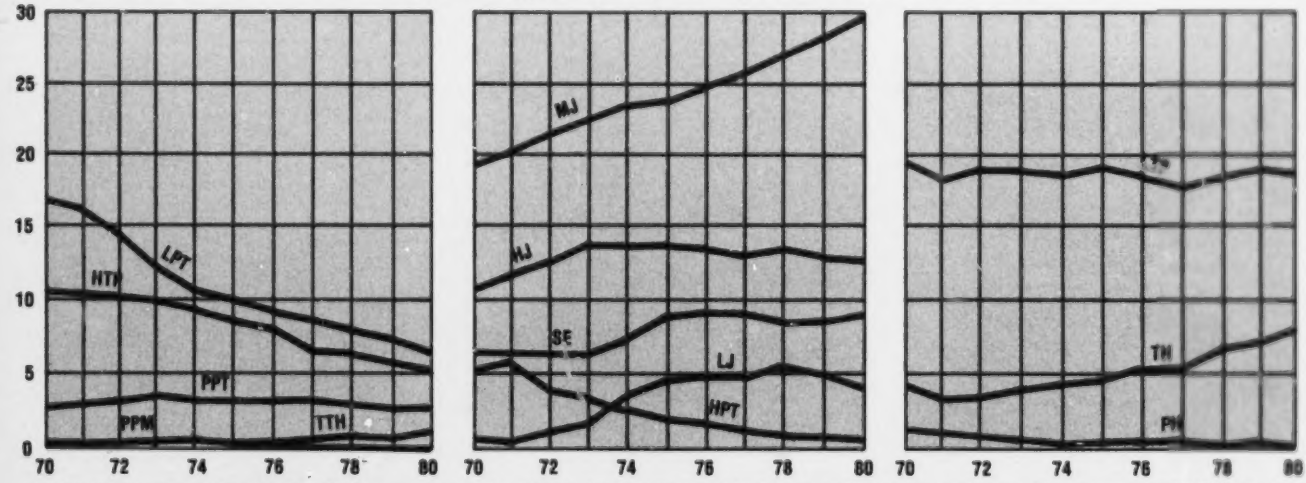
Plotting these percentages on a line graph covering the ten-year period of 1971-1980 is quite revealing. The medium jet had just taken the lead from the light turboprop in 1971 with 263 units or

Units of Aircraft Type



The medium jets — the Sabreliner, Falcon 20, Citation II, III, Learjet 23, 24, 25 35, 55, HS-125, Jet Commander, Westwind, Diamond — have been the most popular aircraft among the *Fortune* 1,000 companies for the past ten years with more than 600 units in the 1980 fleet. Closest rival to the medium jet in popularity is the light turboprop, dominated for the most part by the KingAir series, followed by Cheyennes, Corsairs, Gulfstreams and Solitaires.

Aircraft Type As Percentage of Total Fleet



"Light" aircraft are those of 12,500 pounds or under. Most piston twins and turboprops fit into this category. Turboprops of 12,500 pounds or more are considered "heavy." In jets, the Citation I is the only "light" aircraft. "Medium" jet aircraft are those between 12,500 pounds and 30,000 pounds. "Heavy" jets are 30,000 pounds and over. Categories are based on "Business and Commercial Aviation" magazine standards.

Legend and Examples

SE, Single Engine — 180, 185, 210, Bonanza; **LPT, Light Piston Twin** — Aerostar, Aztec; **PPT, Pressurized Piston Twin** — Chancellor, BE 58T; **HPT, Heavy Piston Twin** — DC3, Mallard, 44; **PPM, Pressurized Piston 4-Engine** — DC6-7; **LTP, Light Turboprop** — KingAir, 90, 100, 200; **HTP, Heavy Turboprop** — G-1, Merlin, F-27; **LJ, Light Jet** — Citation I; **MJ, Medium Jet** — Sabreliner, Falcon 20, Citation II, Learjet 23, 24, 25, 35, 55, HS-125, Jet Commander, Westwind, Diamond; **HJ, Heavy Jet** — Jetstar, Falcon 50, BAC 1-11, GII; **PH, Piston Helicopter** — 12E, S-58; **TH, Turbine Helicopter** — 205 A, H 500; **TTH, Twin Turbine Helicopter** — S-76, 222.

20.1 percent of the fleet. The medium jet has culminated a ten-year positive growth with 604 units and 30 percent of the total fleet in 1980. This yields an annual growth in fleet size of 9.7 percent.

Light Turboprop Very Popular

The light turboprop has hovered around the 19 percentile for the last ten years. The primary reason it has done so well is due to the fantastic growth of the Beech King Air. This aircraft has grown at an annual rate of 6 percent over the last ten years, and accounted for the most growth of any aircraft last year. The King Air series accounts for 63.1 percent of the light turboprop market. The stable turboprop market is primarily due to the extremely good sales of this aircraft. Nevertheless, the fleet has increased in size by a rate of 5.4 percent, but has only increased 0.8 percentage points in total fleet size over the last ten years.

Other gainers during the year included the single engine piston aircraft up 0.3 points to 8.0 percent of the total fleet value, pressurized piston twins were up 0.2 to 3.2 percent, and the twin-turbine helicopter up 0.3 points to 1.9 percent. All others were losers or held their own ground during 1980.

Status Against a Growing Fleet

These figures represent their status against a *growing* fleet. For example, the heavy jets grew from 233 to 250 units last year, resulting in a 7.3 percent increase in size. The total fleet size, however, grew from 1,842 to 2,012 units, or a 9.2 percent increase in size. Since the heavy jets' growth was less than the total, this appears as a decline on the graph. For any category to maintain a straight line, its growth must equal that of the total. With the huge growth of the medium jet, it is easy to see why some categories which are making modest gains in the ***Fortune*** 1,000 industrial usage appear as losers.

Rates of Growth

It is also interesting to note the *rates* of growth over the last year. Trends to eliminate the piston helicopter are apparent: they receive the award for the biggest loser with almost 39 percent in comparison to the fleet as a whole. This is even more amazing in that they had the largest gain, with a 28.0 percent growth the year before. Again, this may not be too indicative of a great change, as the fleet size is very small (8), and any change will be enormous. Other losers were the light jet (−9.44), heavy turboprops and pressurized piston twins tied (−8.45), light piston twins (−1.87), and heavy piston twins (−1.13) percent.

Examining the heavy turboprops and pressurized piston twins momentarily, one sees that both experienced zero growth in fleet size over last year. The −8.45 figure is indicative of the growth the entire fleet experienced over the previous year.

The biggest gainer in fleet size only took a meager 4.5 percent gain in growth. The top gainer this year was the twin turbine helicopter with 9.3 percent growth. In second came the pressurized piston twins (6.26), next were the turbine helicopters (5.52), followed by the medium jets (4.53) and finally the single engine took last place in gainers with 3.89 percent growth.

These trends of growth and decline are basically consistent throughout the period and, as such, are reflected in the single-year 1980 results, during which turbine helicopters and medium jets outpaced the total fleet growth. Piston growth appears to be largely dependent on escalating fuel prices. There appears to be a one to three year lag time between stabilizing fuel prices and growth in the area, depending on the size and consumption of the aircraft.

Comparative Fleet Size

Number of Aircraft	Number of Companies
1	188
2	112
3	79
4	38
5	22
6	28
7	17
8	12
9	5
10	6
11	7
12	3
13	2
14	6
15	5
17	3
18	2
19	1
22	1
24	1
28	1
32	1
36	1
37	1
38	1
2012	541

Most companies continue to operate one aircraft. Thirty-five percent or 188 of the 541 aircraft operating companies utilize a single aircraft. Twenty-one percent or 112 companies use two aircraft.

Fleet Value Increases 82 Percent

Fortune 1,000 aircraft operators spent $385 million for new and used equipment during 1980 — a record — and took the total fleet value to just under $3.21 billion, 82 percent higher than the previous year. Of that amount, a staggering 123.1 percent, or $1,510.9 million was accounted for by heavy jets, and 62.4 percent, or $1,137.7 million by medium jets.

Some of the increase in prices is due to inflation but most of the increase is accounted for by an adjustment in prices to reflect current market value. Aircraft in previous studies were priced too low.

Percentage Increase

In terms of percentage increase in fleet value during 1980, heavy jets led the way with 123.1, followed by twin turbine helicopters at 108.0, heavy turboprops at 94.3, then medium jets at 62.4, single engine at 57.9 and turbine helicopters at 45.5. Piston helicopters were the only aircraft in the fleet that dropped in value, by 48 percent. This is due to both value and size of the fleet, with twelve units operating last year with an average value of $53.5 thousand per aircraft. This year, there were only eight units operating with an average value of $41.7 thousand per aircraft.

Twin-Turbine Helicopter Growth

Since 1972 there has been a 216 percent increase in the turbine helicopter fleet among ***Fortune*** operators, compared to a 505 percent increase in the fleet value of those turbine helicopters. This reflects not only the corporate switch from single to twin-turbine machines, but the increased acceptance of the corporate helicopter by previous non-users. The availability of twin-turbine machines with single pilot IFR certification should make the twin-turbine helicopter even more attractive.

$6 Billion by 1984

More significantly, if ***Fortune*** 1,000 companies continue to increase the value of the fleet by the existing five-year average of 23.9 percent per year, they will have spent $765 million in 1981 putting the ***Fortune*** 1,000 fleet close to the $4 billion mark, and another $948 million in 1982. The $6 billion mark should be reached by the end of 1984 by the ***Fortune*** 1,000 fleet.

Aircraft Value and Distribution

	Parent Companies		Subsidiary Companies		Total	
	Number	$ Value	Number	$ Value	Number	$ Value
Single Engine (SE)	66	2,390,500	94	3,064,100	160	5,454,600
Light Piston Twin (LPT)	67	8,042,100	73	7,541,700	140	15,583,800
Pressurized Piston Twin (PPT)	25	4,449,000	40	7,473,700	65	11,922,700
Heavy Piston Twin (HPT)	15	1,044,600	12	533,000	27	1,577,600
Four Engine Piston (PPM)	2	139,700	0	0	2	139,700
Light Turboprop (LTP)	233	180,826,800	155	106,478,800	388	287,305,600
Heavy Turbopro (HTP)	86	84,432,100	16	14,290,400	102	98,722,500
Light Jet (LJ)	68	55,485,300	23	19,891,600	91	75,376,900
Medium Jet (MJ)	478	933,469,800	126	204,279,200	604	1,137,749,000
Heavy Jet (HJ)	236	1,433,278,000	14	77,578,200	250	1,510,856,200
Piston Helicopter (PH)	4	175,100	4	158,700	8	333,800
Turbine Helicopter (TH)	68	14,744,700	68	15,272,600	136	30,017,300
Twin Turbine Helicopter (TTH)	33	24,321,500	6	5,646,200	39	29,967,700
Totals	1381	$2,742,799,200	631	$462,208,200	2012	$3,205,007,400

Who's Operating What?

In the top 500 industrials, turbojet/turbo fan aircraft sharply outnumber other types. While in the bottom 500, it is the turboprop airplane that is most popular.

Top 100

The same is true when considering aircraft by type. The top 100 companies lead in all cases — 56 percent of the piston singles, 29 percent of the piston twins, 35 of the turboprop aircraft, 44 percent of the turbojets/turbofans, and 65 percent of the helicopters.

Top 200

The top 200 industrials account for 72.5 percent of the singles, 45.1 percent of the twins, 48.5 percent of the turboprop airplanes, 64.7 percent of the turbojets/turbofans, and 78.1 of the helicopters. The trend is still fairly consistent in the top 300 corporations, with 82.5 percent accounted for by the singles, 57.1 percent by the twins, 60.3 percent by the turboprops, 78.5 percent of the turbojets, and 86.3 percent of the helicopters.

300 and Below

Below the 300 level, 3.1 percent of the singles are operated by the 601-700 group, 11.6 percent of the twins are operated by the 301-400 group, 14.5 percent of the turboprops are operated by the 301-400 group, 7.0 percent of the turbojets/turbofans are operated by the 601-700 group.

It is not surprising that 34.8 percent of the ***Fortune*** 1,000 aircraft operators have only one airplane each, while 20.7 percent operated only two. NBAA, which numbers most of ***Fortune*** 1,000 operators among its 2,500 members registers 64 percent companies with one aircraft. On the other hand, 42 companies, or 7.8 percent of the ***Fortune*** operators, have fleets of 10 or more aircraft each, with the largest fleet consisting of 38 aircraft.

King Air Most Popular

The Beech King Air series is most popular based on number of units in the fleet — 245 or 12.2 percent. Of this 45.3 percent are the model 200, which includes one cargo door model. The

Supercorporation Fleet Summary

	Piston	Turbo Prop/Shaft	Turbojet	Total
Airplanes				
Multi-Engine	2	1	94	97
Single-Engine	160	5	2	167
Twin-Engine	231	485	849	1565
Sub-Total	392	491	945	1829
Helicopters				
Single-Engine	8	136	0	144
Twin-Engine	0	39	0	39
Sub-Total	8	175	0	183
Grand Total	401	666	945	2012

Turbojet aircraft constitute the bulk of the fleet with 945 aircraft or 47 percent. Large gains are being registered with turboprops and turbine helicopters.

Dassault Falcon series is second at 155 units. In addition, there are 139 Sabreliners, 136 Learjets, 133 Gulfstream GII-III's, 127 Citations and 98 Jetrangers in the ***Fortune*** aircraft fleet.

Average Age

The average year of manufacture for the entire fleet is 1973. By category, the average year is 1973; Turboprops, 1972; pistons, 1970; turbine helicopters, 1975; and piston helicopters, 1970.

Average year of Manufacture

Jets	1973
Turpoprops	1972
Pistons	1970
Turbine Helicopters	1975
Piston Helicopters	1970

Turbine helicopters are the most recent addition to the corporate fleet so their average age of manufecture is lowest — 1975. Piston fixed-wing and helicopters are the oldest in the fleet with an average age of manufecture of 1970.

Airline Types

The ***Fortune*** 1,000 companies still operate 13 DC-3's. In terms of airline-type jet transports, there are 16 BAC 1-11's operated by eleven companies, three Boeing 707's, six Boeing 727's operated by four companies, three Boeing 737's, one DC-9, one Fokker F28, and a Convair 990 and 880 operated by the manufacturer.

150 Models, 46 Manufacturers

All in all, there are 150 different models of aircraft contained in the ***Fortune*** 1,000 fleet produced by 46 manufacturers. Eight manufacturers accounted for 77.1 percent of the total 1980 fleet and 81.0 percent of the dollar value. Together, Beech, Cessna, Dassault, Gulfstream American, British Aerospace, Gates Learjet, and Rockwell International represented 1,552 units, valued at $2.6 billion.

Beech led in total units with 327, followed by Cessna with 325, Gulfstream American with 214 and Rockwell with 186. Gulfstream American was by far the leader in dollar value with $1,117.7 million, followed by Dassault with $336.5 million and Rockwell with $275.0 million. The remaining five all accounted for dollar values in excess of $150 million.

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1982 — Section 2

business flying

NATIONAL
BUSINESS AIRCRAFT
ASSOCIATION, INC.

Business Aircraft Statistical Data—1980

Introduction

The Federal Aviation Administration annually publishes a series of statistics that demonstrate how General Aviation fits into the overall aviation picture and what part business and corporate aviation plays in this picture. The latest published figures are those for 1980. Figures are based on a statistically designed sample of about 14 percent of registered general aviation aircraft.

There is no question that General Aviation is the dominant force in the sky with 98.6 percent of the civil air fleet, 83.9 percent of civil operations at FAA towered airports and close to 83.3 percent of the total hours flown by the U.S. civil air fleet.

General Aviation, by FAA definition, includes all aircraft operated under

Part 91: General operating and flight rules
Part 123: Air travel clubs, using large aircraft
Part 133: Rotorcraft external load operations
Part 135: Air taxi operators and commercial operators of small aircraft
Part 137: Agricultural aircraft operations

The FAA has divided the aircraft that operate under these flight rules into nine "primary use" categories. By definition they are as follows:

Corporate: Any use of an aircraft by a corporation, company, or other organization for the purpose of transporting its employees and/or property, but not for compensation or hire, and employing professional flight personnel for the operation of the aircraft.

Business: Any use of an aircraft, not for compensation or hire, by an individual for the purpose of transportation required by a business in which he is engaged.

Personal: Any use of an aircraft for personal purposes not associated with a business or profession, and not for hire.

Aerial Application: Consists of those activities that involve the discharge of materials from aircraft in flight.

Instructional: Any use of an aircraft for the purpose of formal instruction with the flight instructor aboard.

Commuter Carrier: A Part 135 operator that makes at least five scheduled round trips per week between two or more points or carries mail.

Air Taxi: Any use of an aircraft by the holder of an Air Taxi Operating Certificate.

Industrial: Use of an aircraft for specialized work allied with industrial activity — pipeline patrol, survey, advertising, photography, helicopter hoist.

Rental: Aircraft used primarily for short periods by airmen on which a fee is paid.

Other: Research and development, marketing and sales demonstration, sport parachuting, etc.

NBAA voting members are in the corporate and business category.

Figures for 1980 do not reflect the disruption to the system caused by the air traffic controller's strike in August 1981. Predictions for subsequent years were made at a later date by the FAA and do account for changes in the system predicated on gradual return to normal traffic patterns as the air traffic system readjusts and renews itself.

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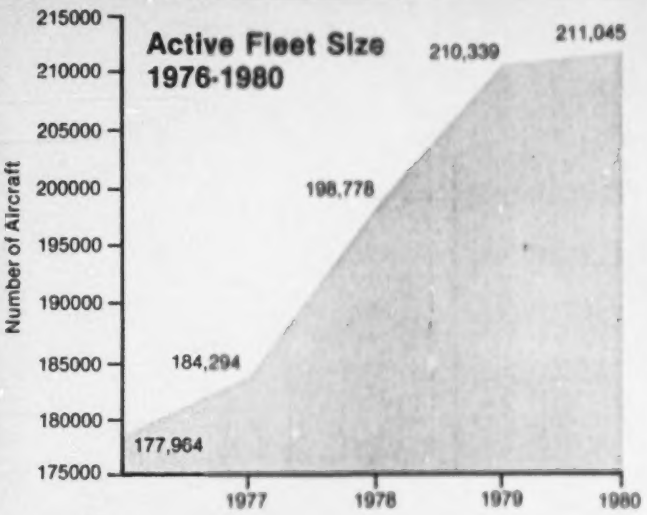
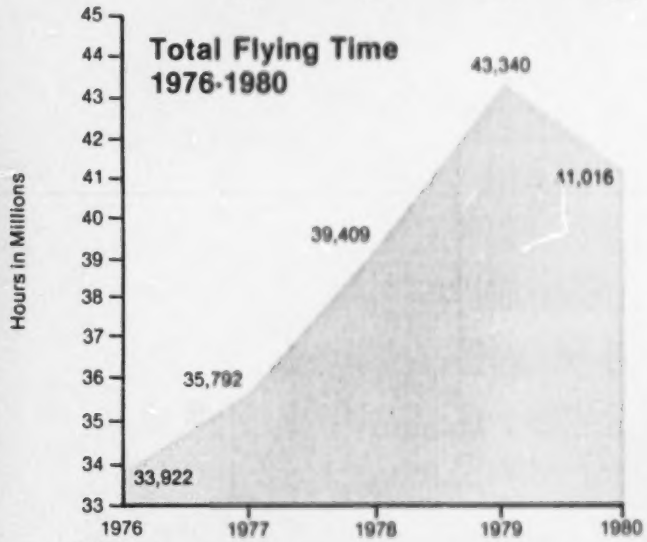
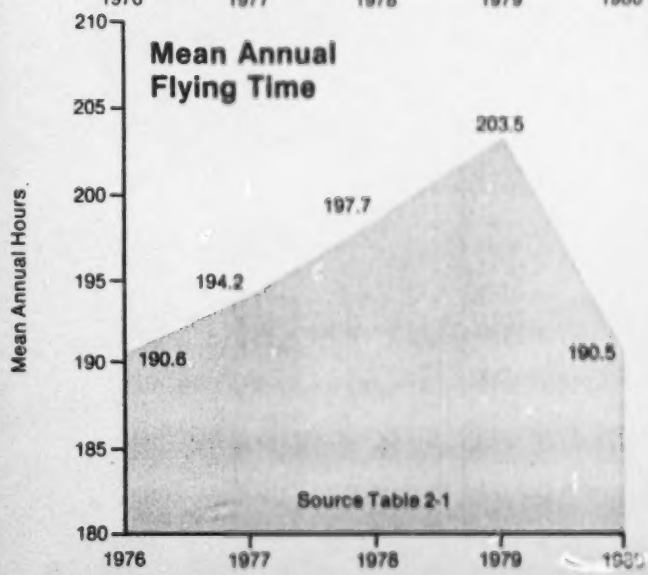
Summary — 1980

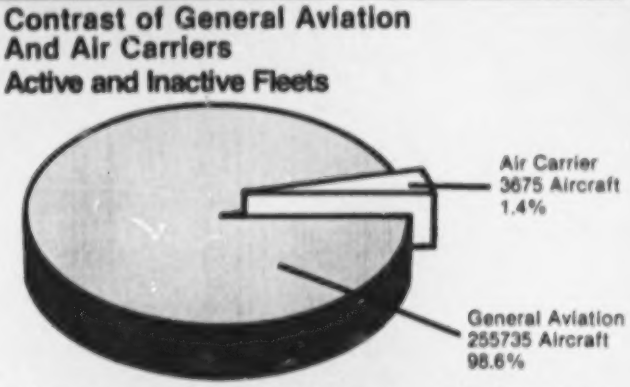
- An estimated 41.0 million hours of flying time were logged by the 211,045 active general aviation aircraft in the U.S. fleet during 1980. These aircraft had a mean annual flight time per aircraft of 190.5 hours and represented about 83 percent of the registered general aviation fleet.
- Turboprop aircraft flew over 533 hours per aircraft during 1980, more than any other aircraft type. Twin engine turboprops with thirteen or more seats flew more than 1,000 hours per aircraft. In contrast, single-engine piston-powered aircraft averaged about 168 hours per aircraft during the year.
- The most common primary use of a general aviation aircraft was Personal for an estimated 46 percent of the active fleet, followed by business for 23 percent of the fleet, and executive and aerial application for 7 percent of the fleet each.
- Over 83 percent of the general aviation aircraft had two-way VHF communication equipment, 61 percent were equipped with 4096-code transponders, over 55 percent had at least one component of an instrument landing system, and almost 80 percent had some form of navigation equipment.
- An estimated 22 percent of general aviation aircraft had avionics equipment enabling them to fly above 18,000 feet in positive controlled airspace. Approximately 72 percent of the GA fleet could not fly above 12,500 feet due to avionics limitations alone.
- An estimated 42 percent of the active general aviation fleet flew by instrument flight rules (IFR) at some time during 1980.
- The general aviation aircraft fleet consumed an estimated 1,286 million gallons of fuel during 1980, 520 million gallons of aviation gasoline and 766 million gallons of jet fuel.

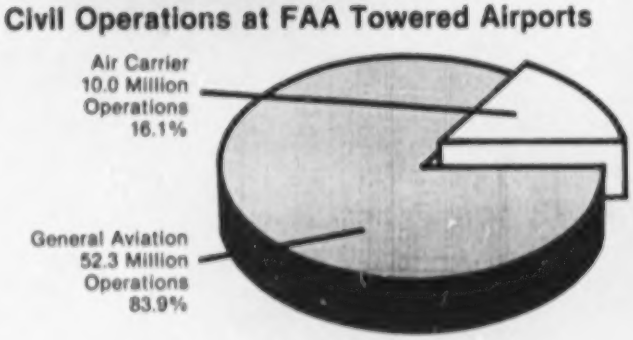
General Aviation Trends

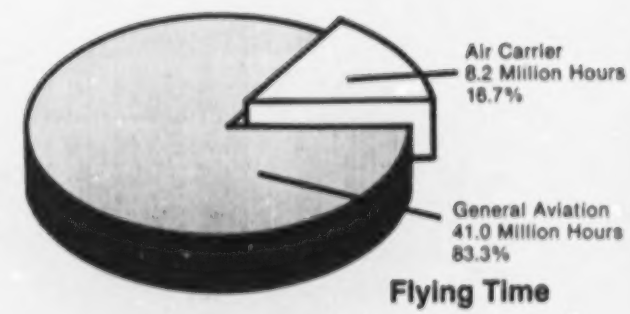












Overall Trend — 1980

The statistics for 1980 showed a 5.4 percent decrease in flying hours, a 0.3 percent increase in the number of active aircraft in the general aviation fleet, and a 6.4 percent decrease in mean hours per aircraft over the comparable figures for 1979.

Activity estimates for 1980 indicate an overall slowing in the growth of general aviation activity with more emphasis on business aviation.

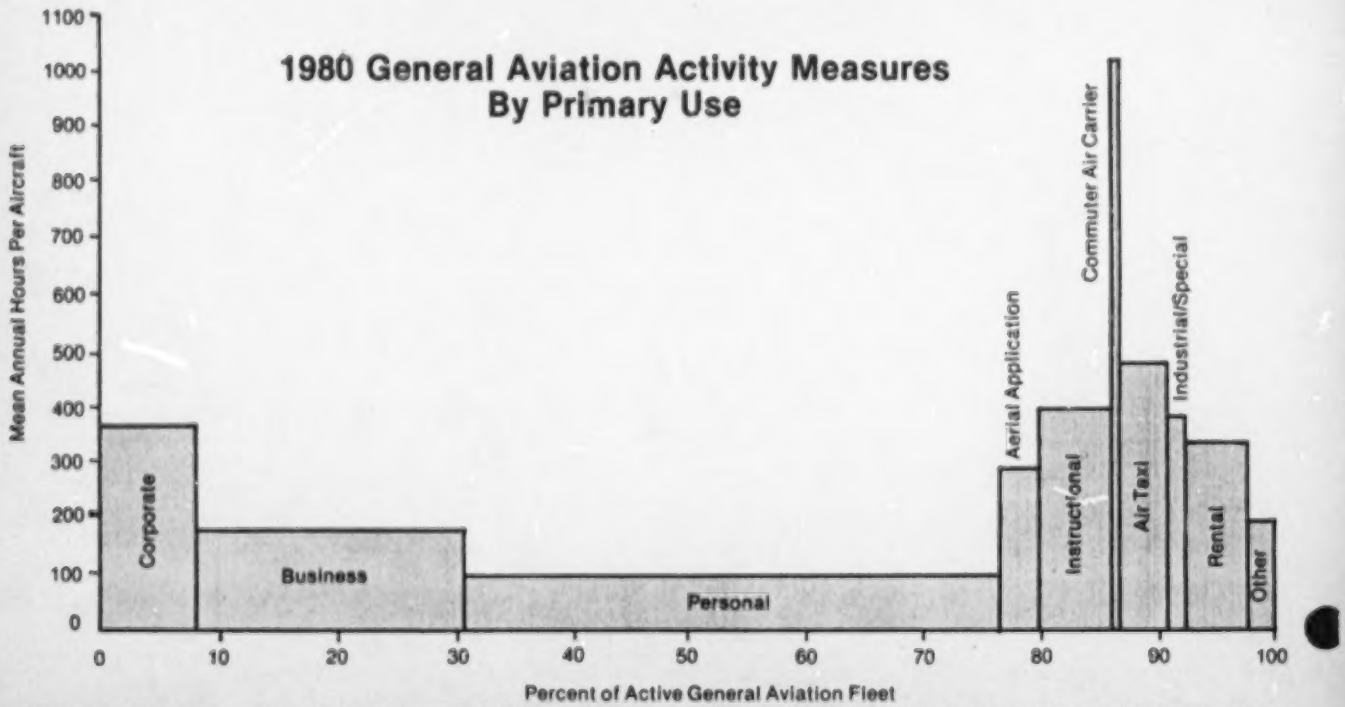
The decrease seen in mean hours shown per aircraft can most likely be attributed to the decline in the economy and rising fuel and aircraft operational costs at that time. Other general aviation activity measures showed similar trends. For example, general aviation operations at FAA towered airports decreased by 6.9% from 1979 to 1980.

General Aviation Trends

1980 — Aircraft Units and Hours Flown — By Primary Use

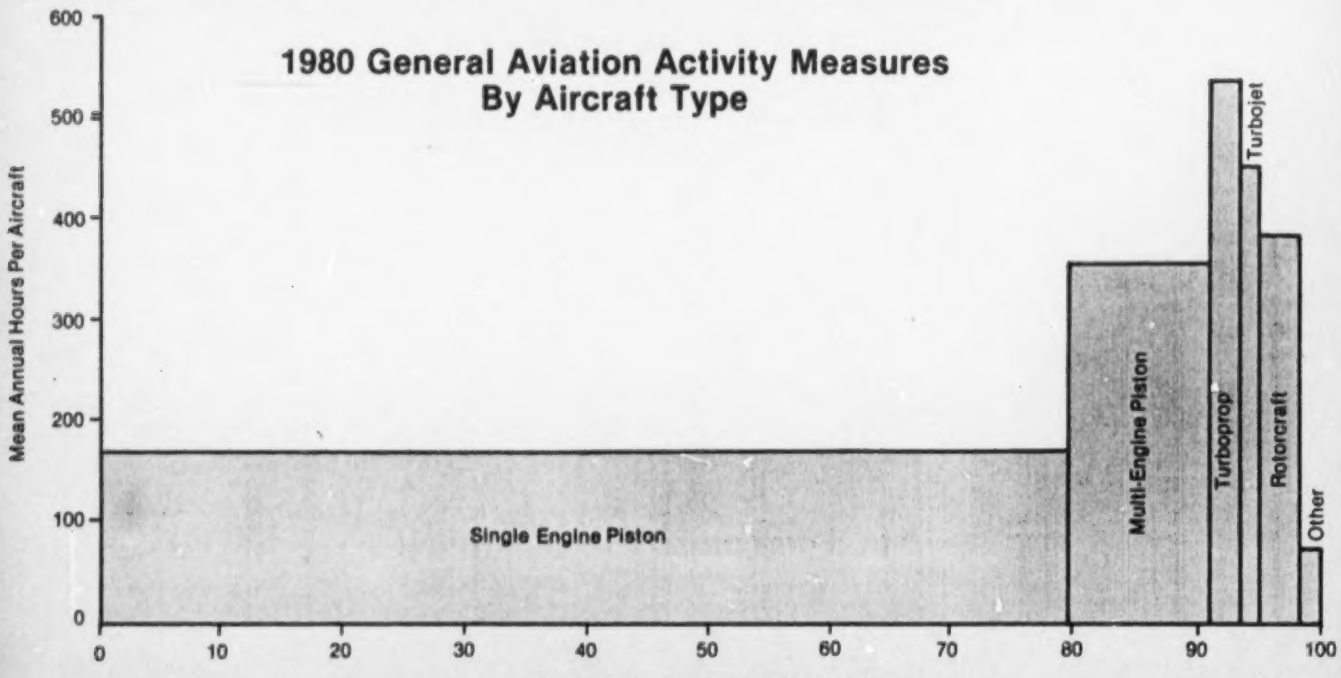
■ Units
■ Hours

Aircraft Type	Total Active	Corporate	Business	Total Corporate Business	Personal
Fixed Wing					
Single Engine—Piston					
Units	168,435	3,202	38,374	41,576	89,250
Hours	28,339,000	1,078,000	6,180,000	7,258,000	8,255,000
Twin Engine & Other Piston					
Units	24,578	5,642	9,342	14,984	3,050
Hours	6,290,000	1,635,000	1,784,000	3,419,000	421,000
Total Piston					
Units	193,014	8,845	47,717	56,562	92,301
Hours	34,746,000	2,731,000	7,938,000	10,669,000	8,661,000
Turboprop					
Units	4,030	2,600	420	3,020	10
Hours	2,239,000	1,172,000	189,000	1,361,000	2,000
Turbojet					
Units	2,992	2,350	110	2,460	3
Hours	1,331,000	1,071,000	41,000	1,112,000	—
Total Fixed Wing					
Units	200,097	13,796	48,248	62,044	92,320
Hours	38,318,000	4,940,000	8,147,000	13,087,000	8,664,000
Total Rotorcraft					
Units	6,001	947	749	1,696	592
Hours	2,338,000	380,000	257,000	637,000	34,000
Total Aircraft					
Units	211,045	14,860	49,391	64,251	96,222
Hours	41,015,000	5,331,000	8,433,000	13,764,000	8,893,000



General aviation aircraft were used most commonly for personal and business purposes, representing 46 and 23 percent of the active fleet. While total hours flown for the general aviation fleet decreased by 5.4% from 1979 to 1980, flying time for corporate aircraft increased by 6.6%. This was the only use category for which flying time increased from 1979 to 1980. Due either to their high representation in the fleet or to their high individual usage, personal, business, corporate, air taxi, commuter and instructional use aircraft together accounted for 80 percent of the total hours flown by the general aviation fleet.

Aerial Application	Instructional	Commuter Carrier	Air Taxi	Industrial	Rental	Other
6,160	13,357	105	2,945	1,483	10,718	2,837
1,711,000	5,343,000	66,000	1,292,000	45,000	3,477,000	514,000
386	577	566	3,192	341	510	963
41,000	181,000	492,000	1,416,000	86,000	176,000	137,000
6,548	13,934	673	6,139	1,824	11,229	3,800
1,769,000	5,530,000	560,000	2,709,000	54,000	3,654,000	655,000
58	1	256	501	9	70	161
32,000	—	395,000	319,000	4,000	30,000	65,000
—	52	9	197	23	44	205
—	25,000	5,000	82,000	14,000	22,000	66,000
6,607	13,988	940	6,827	1,856	11,344	4,167
1,801,000	5,550,000	959,000	3,102	—	—	—
684	274	1	785	956	260	749
239,000	69,000	1,000	439,000	496,000	195,000	203,000
7,294	14,862	944	7,615	2,813	11,829	5,216
2,043,000	5,748,000	960,000	3,535,000	1,052,000	3,917,000	1,008,000



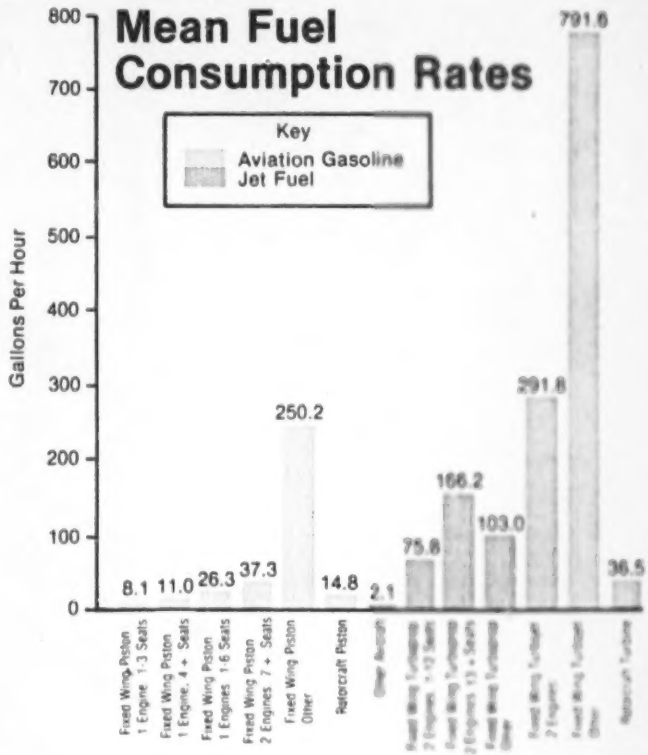
In terms of sheer numbers, single engine piston aircraft still dominated the active fleet and contributed the largest portion of total flying time, yet had one of the lowest mean flight times per aircraft. In contrast, turbocrops, turbojet aircraft, and rotorcraft had low representation in the active fleet but contributed a relatively high proportion of flight time resulting in the greatest mean flight hours of any of the major aircraft types.

Fuel

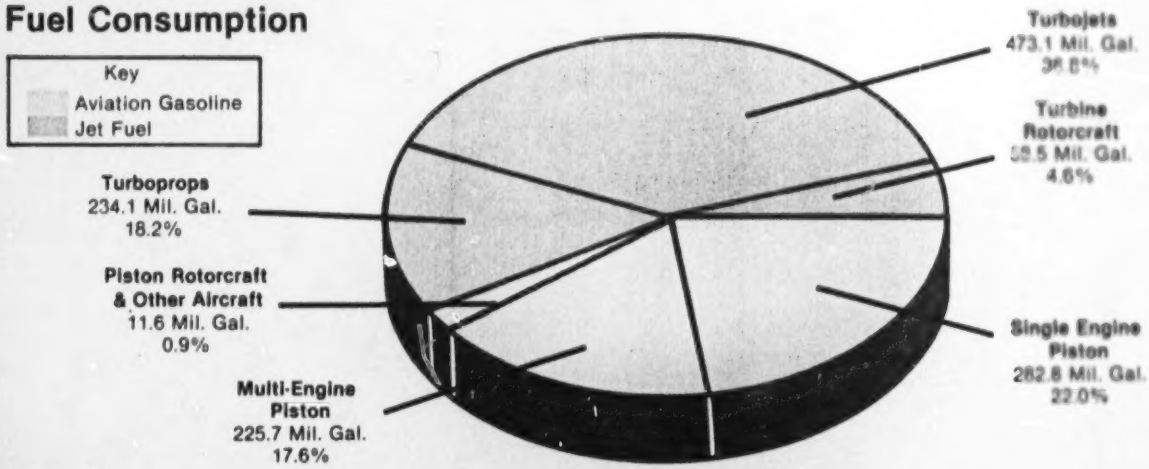
Fuel Consumed

Aircraft Type	Mean Rate Gp II	Estimated Fuel Use (mil gal)
Fixed Wing		
Piston		
1 Eng 1-3 Seats	8.14	81.79
1 Eng 4+ Seats	10.99	200.98
Total 1 Eng	9.98	282.77
2 Eng 1-6 Seats	26.30	98.11
2 Eng 7+ Seats	37.29	94.38
Total 2 Eng	30.26	193.09
Other Piston	250.20	32.59
Total Piston	14.63	508.45
Turboprop		
2 Eng 1-12 Seats	75.80	112.88
2 Eng 13+ Seats	166.22	115.38
Total 2 Eng	104.55	228.26
Other Turboprop	103.02	5.90
Total Turboprop	104.51	234.07
Turbojet		
2 Eng	291.81	330.25
Other	191.63	133.81
Total Turbojet	355.26	473.06
Total Fixed Wing	**31.72**	**1215.58**
Rotorcraft		
Piston	14.75	10.85
Turbine	36.51	58.52
Total Rotorcraft	**29.67**	**69.33**
Other	2.09	0.75
Total Aircraft	**31.35**	**1285.71**
Total Jet Fuel	147.98	765.65
Total Aviation Gasoline	14.51	520.06

Mean Fuel Consumption Rates



Fuel Consumption



Jets, Turboprops Use Most Fuel

The general aviation aircraft fleet consumed an estimated 1,286 million gallons of fuel during 1980, 520 million gallons of aviation gasoline and 766 million gallons of jet fuel. Turbojet and turboprop engines consume fuel at much higher rates than piston engines. The high rates account for turbojets burning 37 percent of all fuel consumed in 1980. Piston aircraft account for 40 percent of the fuel consumed in 1980 due to their high representation in the general aviation fleet.

Avionics Use

Corporate and Business Avionics

	VHF Comunications				Transponder Equipment			ILS Receiving Equipment				
	360 CE	720 CH	2+ Sys	No Comm	4096 Code	ALT Enc	No Trans	Loc	Mker EEC	Glide Slope	MLS	No ILS
Corporate												
Estimated Population	4,374	11,791	11,905	193	14,472	12,234	1,060	14,106	13,591	13,178	295	1,344
Estimated % of Use	29.5	79.4	80.2	1.3	97.5	82.4	7.1	95.0	91.5	88.8	2.0	9.1
Business												
Estimated Population	23,649	29,243	36,710	1,478	44,930	25,718	6,166	40,105	38,647	35,339	43	10,152
Estimated % of Use	47.9	59.3	74.4	3.0	91.1	52.1	12.5	81.3	78.3	71.6	0.1	20.6

Navigation Equipment

	VOR 100CH	VOR 200CH	2+ RCVR	ADF	DME	RNAV	RNAV	Flt Dir	Radar Alt	FltMgt Comptr	No NAVEQ
Corporate											
Estimated Population	3,356	12,096	13,292	14,165	12,565	6,807	2,070	8,238	7,292	1,004	484
Estimated % of Use	22.6	81.5	89.5	95.4	84.6	45.8	13.9	55.5	49.1	6.8	3.3
Business											
Estimated Population	16,657	33,658	40,062	40,049	27,452	8,695	552	5,748	4,137	705	2,068
Estimated % of Use	33.8	68.2	81.2	81.2	55.6	18.0	1.1	11.7	8.4	1.4	4.2

More Sophisticated Avionics

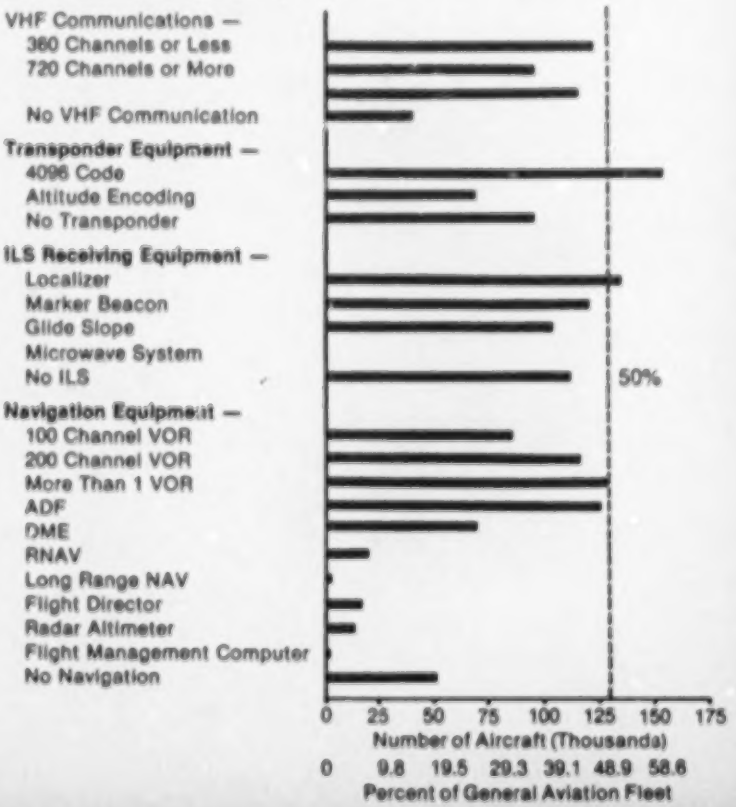
Over 83 percent of the aircraft have two-way VHF communications, 61 percent are equipped with 4096-code transponders, 55 percent have at least one component of an instrument landing system, and almost 80 percent have some form of navigation equipment. It is evident from comparing the 1980 and 1978 avionics estimates that the general aviation fleet is becoming more sophisticated in terms of its avionics equipment. Within two-way communications, for example, there was a significant shift from 360 channel to 720 channel equipment. Likewise with VOR receivers there was a shift from 100 channel to 200 channel equipment. The proportion of the general aviation fleet with transponders increased from 53.3 percent in 1978 to 61.1 percent in 1980, and the proportion with at least one part of an ILS increased from 51.0 percent to 55.2 percent. The proportion of aircraft having two or more communications systems and the proportion with two or more VOR receivers increased by more than four percent from 1978 to 1980.

About 22 percent of GA aircraft have the avionics equipment enabling them to fly above 18,000 feet in positive controlled airspace. Approximately 72 pecent of the GA fleet cannot fly above 12,500 feet due to avionics limitations alone.

Over 77 percent of GA aircraft are equipped to fly IFR.

More than 16 percent of the GA fleet are limited to landing at uncontrolled airports. Approximately 24 percent can land at either uncontrolled airports or Group II TCA's. Approximately 32 percent can land at any type of airport except a Group I TCA. About 28 percent can land at Group I TCA's. This proportion has increased constantly over the past 5 years.

Avionics Equipment



Forecasts

Production

As of January 1	Total	Piston		Turboprop	Turbojet
		Single Engine	Multi-Engine		
1975	14,056	11,439	2,116	305	196
1976	15,449	12,783	2,120	359	187
1977	16,907	14,057	2,195	428	227
1978	17,811	14,398	2,634	548	231
1979	17,048	13,286	2,843	637	282
1980	11,877	8,640	2,116	795	326
1981	9,457	6,608	1,542	918	389

Changing Composition of Activity

Trends in the overall economy are creating major changes within general aviation. Over the past several years general aviation has become increasingly important as a means of transportation for business use. Events which have contributed to this are business dispersion and centralized management, changing air carrier route structures and the cost advantage of general aviation relative to other competing modes of transportation. Evidence for this increase in business use may be drawn from the patterns of growth in the general aviation fleet, aircraft sales, total hours flown, and the pilot population.

Fleet Composition and Aircraft Sales

As of January 1, 1981, the general aviation fleet consisted of 211,000 aircraft, representing an annual growth rate of 4.6 percent during the 1975 to 1981 period. During this same period, single-engine piston aircraft increased at as yearly rate of 4.2 percent and the turbine powered aircraft grew at a 11.5 percent rate. The total fleet increased only 0.5 percent in 1981; however, the turbine powered part of the fleet experienced a 7.3 percent increase. While, in the short-term, the growth rate of the fleet will be less than has been experienced during the 1970's, the long-term trend suggests a sustained growth close to historical levels.

Total production of general aviation aircraft (excluding helicopters, balloons, dirigibles, and gliders) declined about 20 percent in 1981. While production of single-engine and multi-engine piston aircraft declined significantly, the production of turbo-prop and turbo-jet aircraft increased 19 percent and 15 percent, respectively. Latest industry estimates indicate that 1982 production levels will decline over 13 percent to approximately 8,200 aircraft.

Industry sources indicate that approximately 90 percent of the sales of general aviation jet aircraft are intended for business use. Approximately 80 to 85 percent of the turbo-prop aircraft and about 60 to 70 percent of the multi-engine piston aircraft are sold for business use. Less than 30 percent of the single engine piston aircraft are sold for business purposes. However, the percentage of single engine piston aircraft sales intended for business use has increased from about 10 percent in 1969 to approximately 25 percent in 1978, while the percentage of single engine aircraft purchased for personal use has declined from 42 percent to 34 percent, and instructional use, from 27 percent to 17 percent during this period.

An indication of the growth in the demand for air traffic control and navigation services by general aviation is the significant growth in the number of aircraft equipped with sophisticated avionics. This trend is most pronounced for piston aircraft and rotorcraft. For the period 1977 through 1980, the piston fleet population grew 19 percent, while the number of aircraft equipped with transponders grew 44 percent, and the number equipped with Instrument Landing Systems (ILS) grew 34 percent. Turbojet and turboprop aircraft typically are equipped to make full use of navigation and air traffic control services.

Hours Flown

The FAA estimate of total general aviation hours flown in 1981 was 42.7 million hours. Single-engine piston aircraft accounted for 69 percent of all hours flown, multi-engine aircraft for 16 percent, and turbine powered aircraft for 9 percent. The single-engine piston aircraft hours flown grew less than 2 percent in 1981, while turboprop hours increased 9.5 percent and turbojet hours flown increased 7.7 percent. During the period 1975 through 1981, single-engine piston aircraft hours flown increased at a 4.3 percent rate, turbine powered aircraft hours grew at a 9.9 percent rate, and total hours flown grew at a yearly rate of 5.0 percent.

In 1980, personal and instructional use accounted for 36 percent of all hours flown, and business and executive for approximately 34 percent, compared to 52 percent and 28 percent respectively in 1970. Between 1970 and 1980 the use of general aviation for business grew at a 7 percent rate, personal use grew at a 2 percent rate, while instructional use declined at a 2 percent rate.

Pilot Population

Recent trends within the general aviation pilot population provide further evidence of this sector's changing characteristics. As of January 1, 1981, 42 percent of the licensed pilots possessed an instrument rating compared to 32 percent in 1970. While the total pilot population is growing at a 2 percent annual rate, the number of instrument rated pilots is growing at a 5 percent rate.

Between 1975 and 1978, a period of economic growth and relatively stable real fuel costs, the number of student pilots increased from 177,000 to 205,000. However, this number declined by 5 percent in 1981 and current data indicates a further decline in 1982. This drop is attributable to the relatively high cost of fuel and the economic downturn. Thus, while in the short-run the number of student pilots will remain stable, the long-term trend suggests the number of individuals who want to become pilots will continue to grow at the historical rate.

Forecast

The short-range forecast for general aviation hours flown calls for an increase from 42.7 million hours in 1981 to 43.9 million hours in 1982. Growth over the entire forecast period is expected to average 4.4 percent per year, resulting in an estimated 71.5 million hours flown in 1993.

The industry will experience a continuation of slow growth in the general aviation fleet in the 1981-1983 time period. There will be variations in the number of aircraft added to the fleet each year due in part to changes in economic conditions. However, the net addition to the fleet will average approximately 10,000 aircraft per year between 1981 and 1993.

The significant trend masked by the large number of single engine piston aircraft in the fleet is the continued growth among turbine powered aircraft. The number of turbine powered aircraft is projected to more than double from 7,100 in 1981 to 15,700 in 1993. These new sophisticated aircraft are expected to make extensive use of FAA-provided services.

Estimated Active Aircraft (thousands)

As of January 1	Total	Fixed Wing				Rotorcraft		
		Piston						
		Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine	Balloons Dirigibles Gliders
1982	214.0	169.5	25.4	4.5	3.1	3.1	3.4	5.0
1983	218.1	171.9	26.0	4.9	3.2	3.2	3.6	5.2
1984	223.9	175.9	26.8	5.3	3.3	3.3	3.8	5.5
1985	231.9	181.7	27.8	5.8	3.4	3.4	4.0	5.8
1986	242.4	189.2	29.0	6.3	3.7	3.6	4.4	6.2
1987	253.9	198.0	30.2	6.8	3.9	3.8	4.7	6.5

Airports With FAA Traffic Control Service (millions)

Fiscal Year	Total	Itinerant	Local	No. of Towers
1982	52.6	37.3	15.3	367
1983	59.8	41.3	18.5	389
1984	66.8	45.1	21.7	411
1985	73.6	48.7	24.9	433
1986	79.0	51.8	27.2	435
1987	83.5	54.4	29.1	437

1982-1984 operations reflect the temporary closures of FAA Air Traffic Control Towers.

An aircraft operation is defined as an aircraft arrival at or a departure from an airport with FAA traffic control service. A local operation is performed by an aircraft that: operates in the local traffic pattern or within sight of the tower; is known to be departing for or arriving from flight in local practice areas; or executes simulated instrument approaches or low passes at the airport. All aircraft arrivals and departures other than local are classified as itinerant operations.

Instrument Operations (millions)

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military
1982	34.0 (8.5)	9.1	4.6	16.4	3.9
1983	38.8 (11.2)	9.6	5.1	20.2	3.9
1984	41.4 (11.7)	10.2	5.5	21.8	3.9
1985	43.1 (11.7)	10.4	5.9	22.9	3.9
1986	44.8 (12.0)	10.6	6.4	23.9	3.9
1987	46.2 (12.1)	10.7	6.8	24.8	3.9

An instrument operation is defined as the handling by an FAA terminal traffic control facility of the arrival, departure, or overflight at an airport of an aircraft on an IFR flight plan or the provision of IFR separation to other aircraft by an FAA terminal traffic control facility.

Non-IFR instrument counts at Terminal Control Area (TCA) facilities and Stage III of expanded area radar service are included in the totals and noted in ( ).

The data include instrument operations at FAA operated military radar approach control facilities. Air taxi includes commuter.

IFR Aircraft Handled at ARTC (millions)

Fiscal Year	Total Aircraft Handled	IFR Departures	Overs	Aircraft Handled			
				Air Carrier	Air Taxi	General Aviation	Military
1982	27.0	10.5	6.0	11.8	2.9	7.7	4.6
1983	28.7	11.2	6.3	12.4	3.1	8.6	4.6
1984	30.8	12.0	6.8	13.0	3.4	9.8	4.6
1985	32.4	12.7	7.0	13.3	3.8	10.7	4.6
1986	33.6	13.2	7.2	13.6	4.0	11.4	4.6
1987	34.7	13.7	7.3	13.8	4.2	12.1	4.6

The aircraft handled count consists of the number of IFR departures multiplied by two plus the number of overs. This concept recognizes that for each departure there is a landing. An IFR departure is defined as an original IFR flight plan filed either prior to departure or after becoming airborne. An overflight originates outside the Air Route Traffic Control Center (ARTCC) area and passes through the area without landing. Air taxi includes commuter.

Forecasts

Non-IFR Instrument Operations (millions)

Fiscal Year	Total	Areas	Expanded Radar Service Area Stage III
1982	8.5	2.8	5.7
1983	11.2	3.0	8.2
1984	11.7	3.2	8.5
1985	11.7	3.2	8.5
1986	12.0	3.4	8.6
1987	12.1	3.5	8.6

1982-83 operations reflect the temporary termination of Stage III Service at 34 locations.

Total Flight Services Originated at FSS and CS/Ts (millions)

Fiscal Year	Total Flight Services	Total Pilot Briefs	Flight Plans Originated Total	IFR-DVFR*	VFR
1982	81.2	17.3	8.2	5.9	2.3
1983	84.2	18.2	8.8	6.4	2.4
1984	87.3	19.1	9.5	7.1	2.4
1985	70.2	20.0	10.1	7.6	2.5
1986	74.0	21.3	10.7	8.2	2.5
1987	78.0	22.7	11.3	8.8	2.5

Total Flight Services is a workload measurement derived by multiplying pilot briefs and flight plans originated by two and adding the number of aircraft contacted. A flight plan may be filed orally or in writing to qualify. The data forecast are based upon the current number of and configuration of the Flight Service Stations (FSS) and Combined Station/Towers (CS/T). Changes in their number or configuration may necessitate adjustment in the forecasts.

*Instrument Flight Rules Defense Visual Flight Rules

Active Pilots (thousands)

As of January 1	Total	Students	Private	Commercial	Transport	Helicopter	Glider	Other	Instrument Rated
1982	830.2	192.6	381.3	184.4	74.1	6.6	7.4	3.8	272.9
1983	851.8	200.4	389.7	184.1	78.5	7.1	7.9	4.0	285.3
1984	865.3	201.1	378.2	184.0	82.1	7.5	8.3	4.1	297.5
1985	886.0	207.6	386.7	183.2	87.7	7.8	8.7	4.3	309.5
1986	909.3	217.7	395.1	182.4	92.2	8.2	9.2	4.5	321.6
1987	932.3	227.1	403.6	182.2	96.7	8.5	9.6	4.6	333.6

Estimated Fuel Consumed (millions of gallons)

Fiscal Year	Total Jet Fuel and Aviation Gasoline	Jet Fuel Total	Jet Fuel Air Carrier	Jet Fuel General Aviation	Aviation Gasoline Total	Aviation Gasoline Air Carrier	Aviation Gasoline General Aviation
1982	10,100	9,550	8,537	1,013	550	9	541
1983	10,241	9,680	8,640	1,040	561	7	554
1984	10,732	10,155	9,057	1,098	577	6	571
1985	11,234	10,634	9,447	1,187	600	5	595
1986	11,641	11,012	9,794	1,218	629	5	624
1987	11,996	11,343	10,044	1,299	653	4	649

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